PASSIVE AERODYNAMIC SONIC BOOM SUPPRESSION FOR SUPERSONIC AIRCRAFT

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ABSTRACT

An aircraft capable of supersonic flight comprises a body portion including a fuselage, a wing, and an engine nacelle mounted below the wing. The aircraft may also include a high-mounted aft, tail. The area/lift distribution of the body portion is tailored to reduce sonic boom disturbance. The body portion further includes a blunt nose and a gull dihedral wing configuration that further reduces sonic boom disturbance and eases constraints on area/lift distribution tailoring. The gull dihedral wing or tail is configured to carry lifting force to its trailing edge to create an expansion at the aft end of the aircraft that reduces aft sonic boom ground shock strength. The volume of the mid-portion of the fuselage can be reduced above the wing to create a sloped surface that generates an expansion fan over the wings. The expansion fan lowers the pressure above the wing in the area covered by the expansion to reduce the pressure required on the upper and lower surfaces of the wing to generate the same lifting force.